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EXAMINER

TANG, KAREN C

ART UNIT PAPER NUMBER

2151

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**Technology Center 2100**

**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/043,924

Filing Date: October 22, 2001

Appellant(s): LUBBERS ET AL.

\_\_\_\_\_  
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For Appellant

**EXAMINER'S ANSWER**

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This is in response to the appeal brief filed 7/25/06 appealing from the Office action mailed 1/18/06.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

No evidence is relied upon by the examiner in the rejection of the claims under appeal.

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-18 are rejected under 35 U.S.C. 102(e) as being anticipated by Lagueux et al (US 6,538,669) hereinafter Lagueux.

1. Referring to Claim 1, Lagueux discloses:

a virtualized logical disk object (LUN) representing a virtual storage container (LUN, refer to Col 7), wherein the virtualized logical disk is an abstract representation of physical storage capacity provided by plurality of physical stores (refer to Col 8, Lines 25-35 and Col 17, and Fig 22, 23, and 26); and

a virtual disk object representing a virtual storage container (LUN), wherein the virtual disk object is an abstract representation of one or more virtualized logical disk object, the virtual disk object including an exposed management interface (refer to Col 2, Lines 5-58, and Col 7, Lines 5-30, also refer to Fig 22); and

wherein the virtual disk object is managed through the management interface to select (refer to Col 2, Lines 20-67) the one or more logical disk object represented by the virtual disk object (LUN).

2. Referring to Claim 2, Lagueux discloses:

a derived disk object coupled to the logical disk object and including methods and data structures configured to add storage protocol to the logical disk object (refer to Col 2 and Col 3, and Col 7).

3. Referring to Claim 3, Lagueux discloses:

a presented disk object coupled to the derived disk object and including methods and data structures configured to expose an virtual disk interface to selected clients (Col 15, Col 20 and Col 21).

4. Referring to Claim 4, Lagueux discloses:

a network storage controller including a processor and memory, wherein the logical disk object and virtual disk object are implemented in memory of the network storage controller (Col 2, Col 3, Col 7 and 8).

5. Referring to Claim 5, Lagueux discloses:

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set of persistent objects managed by the network storage controller, wherein the persistent objects represent hardware resource of the network storage system (refer to Col 7).

6. Referring to Claim 6, Langueux discloses:

physical store object representing a physical storage device (refer to Col 8, Lines 15-51); and

a volume object representing storage capacity that can be allocated from the storage device represented by the physical store object, wherein the volume object presents a logical abstraction of the physical store object (refer to Col 7 and Col 8).

7. Referring to Claim 7, Langueux discloses:

a storage cell client object representing a host management agent, wherein the storage cell client object has an interface for coupling to the management interface (refer to Col 6, Lines 59-67 and Col 7).

8. Referring to Claim 8, Langueux discloses:

the storage cell client object is capable of represent a host management agent located in any network coupled computing device (Unix, Window, etc, refer to Col 5, support any kind of protocol, refer to Col 7, Lines 10-20).

9. Referring to Claim 9, Langueux discloses:

providing at least one network storage controller (ISAN server, refer to Col 6) coupled to a plurality of physical disk drives (Col 13) implementing physical storage capacity (refer to Col 17)

creating a physical store object representing each of the plurality of physical disk drives (refer to Col 8, Lines 25-35);

specifying at least some of the plurality of physical disk drives for inclusion in a storage cell (refer to Col 15, Lines 20-45, by choosing/specifying specific disks, 01, 02, and 04, for the mirror function, which, defines as for storage purpose. And Col 16, Lines 8-50);

creating a storage cell object (storage device, refer to Col 8, and Col 9 and Fig 24, which demonstrate creating a storage cell object) representing the storage cell wherein the physical store objects corresponding to the specified physical disk drives are included in the created storage cell (array, refer to Col 9).

10. Referring to Claim 10, Langueux discloses:

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obtaining user specifications of a required failure protection level (refer to Col 9, Lines 20-35, and Col 17, Lines 30-60, Col 20 and Col 21); and

obtaining user specifications of a set of physical disk drives (Col 2, Lines 20-45, Col 3).

11. Referring to Claim 11, Langueux discloses

creating a volume record (backup, refer to Col 8, Lines 25-67 and Col 9) on each of the physical disk drives includes in the created storage cell.

12. Referring to Claim 12, Langueux discloses

creating a management logical disk object storing metadata describing the created storage cell object (refer to Col 7, Lines 5-15, Col 8, Lines 25-67 and Col 9, Lines 1-30).

13. Referring to Claim 13, Langueux discloses

verifying that at least four physical store objects were specified before creating the storage cell object (refer to Col 16, Col 17, and Col 18).

14. Referring to Claim 14, Langueux discloses

verifying the sufficient physical store object were specified to satisfy the requested device failure protection level before creating the storage cell object (refer to Col 15, Col 16, and Col 20).

15. Referring to Claim 15, Langueux discloses:

verifying that ports of the network storage controller are operational before creating the store cell object (refer to Col 16).

16. Referring to Claim 16, Langueux discloses:

verifying that all of the selected physical store objects are in an operational condition before creating the storage cell object (refer to Col 16).

17. Referring to Claim 17, Langueux discloses:

connecting a host to a network storage controller (NSC) (server, 1250, refer to Col 21) via a host agent (storage director, refer to Col 21) capable of communicating command-response traffic with logical objects implemented in the network storage controller (refer to Col 21 and Col 22).

creating a logical disk object representing a virtual storage container, wherein the logical disk is an abstract representation of physical storage capacity provided by plurality of physical store

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(refer to Col 16, Lines 35-67, the storage is being created/implemented as an HDM, and is closely associated with LUN since the system is giving the device its identifier, and Col 17, and Fig 24 demonstrate the ability to create LUN);

adding a storage protocol to the logical disk object using a derived disk object in response to a user protocol selection (refer to Col 2 and 3);

associating the derived object with a host using a presented disk object referencing the host agent in response to a user host selection (refer to Col 21 and Col 22); and

creating a virtual disk object comprising the logical disk object, the derived disk object and the presented disk object (Table 1, Export table, and Table 2, refer to Col 17 and Col 18 ).

18. Referring to Claim 18, Langueux discloses

providing the user protocol selection and the user host selection via a management console having a computer interface and communicating the user selection to the host agent (Col 2 and Col 3);

#### **(10) Response to Argument**

The examiner summarizes the various points raised by the appellant and addresses replies individually.

Appellant argued that:

1) Prior art did not expressly disclose in Claim 1, “a virtual disk object representing a virtual storage container, wherein the virtual disk object is an abstract representation of one or more virtualized logical disk objects, the virtual disk object including an exposed management interface.

Wherein the virtual disk object is managed through the management interface to select the one or more logical disk objects represented by the virtual disk object.

In reply to the argument, Langueux disclosed a virtual disk object (ISAN server 102A) representing a virtual storage container (virtual device, having a logical address such as LUN to a set of physical storage devices Col 2, Lines 22-27, therefore, the LUN which, represents the virtual storage container, is the virtualized logical disk object), wherein the virtual disk object is an abstract representation of one or more virtualized logical disk objects, the virtual disk object including an exposed management interface (since the virtual disk object is an abstract representation of one or more visualized logical disk object (LUN), LUN itself comprising a interface, Col 2, Lines 20-28, to receive information/commands from the ISAN server, ISAN

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server also comprising the interface to support/manage thousands of LUN, refer to Col 5, Lines Col 7, Lines 5-30, 50-60 and Col 6, Lines 20-40, and Lines 60-67 and Fig 22).

Wherein the virtual disk object (ISAN server 102A) is managed through the management interface (refer to Col 22, Lines 66-67) to select the one or more logical disk objects (refer to Fig 18, 1407) represented by the virtual disk object (refer to Fig 22, different capacity of LUN and Col 2, Lines 20-67).

“It is a common practice and that the storage capacity is allocated to LUNs or a virtual disk.

LUN may comprise a single, multiple disk drives to meet the needs of particular application.”

In the art, virtual disk object, virtual storage device, storage element, array, RAID, Disk Drives, are all used to represent the physical devices and can have different capacity assigned by users to perform functionality such as storing data information.

2. Prior art did not expressly indicate a derived disk object coupled to the logical disk object and including methods and data structures configured to add storage protocol to the logical disk object.

In reply to the argument, Langueux disclose a derived disk object (HDM, refer to Col 8, Lines 20-26) coupled to the logical disk object (connect the virtual device together, refer to Col 8, Lines 20) and including methods and data structures configured to add storage protocol to the logical disk object (refer to Col 2 and Col 3, and Col 7, Col 7, Lines 13-20, need to add protocol in able to communicate with the storage devices and Col 8, Lines 20-21, utilizing SCSI protocol for translation services).

3. Prior art did not expressly indicate a presented disk object coupled to the derived disk object and including methods and data structures configured to expose an virtual disk interface to selected clients.

In reply to the argument, Langueux discloses:

a presented disk object coupled to the derived disk object (communication channel drivers, refer to Col 8, Lines 17) and including methods and data structures configured to expose an virtual disk interface to selected clients (receive configuration from the user to selects host/client and also support management function, which provides ability to selected desired client – refer to Fig 20, 1466, refer to Col 21, Lines 35-38, Col 15, Col 20 and Col 21).

4. Prior art did not expressly disclose a network storage controller including a processor and memory, wherein the logical disk object and virtual disk object are implemented in memory of the network storage controller

In reply to the argument, Langueux discloses:

a network storage controller (ISAN, refer to Col 5, Lines 45) including a processor (Col 21, Lines 40-41) and memory (refer to Col 9, Lines 14-16), wherein the logical disk object and

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virtual disk object are implemented in memory of the network storage controller (Col 2, Col 3, Col 7 and 8).

5. Prior art did not expressly disclose set of persistent objects managed by the network storage controller, wherein the persistent objects represent hardware resource of the network storage system.

In reply to the argument, Langueux discloses:

set of persistent objects (LUN, refer to Col 7, Lines 50-57) managed by the network storage controller, wherein the persistent objects represent hardware resource of the network storage system (LUN represents the virtual device, which represents the physical storage devices, that represent the physical capacity/resource of the device, refer to Col 8, Lines 29-31).

6. Prior art did not expressly disclose physical store object representing a physical storage device; a volume object representing storage capacity that can be allocated from the storage device represented by the physical store object, wherein the volume object presents a logical abstraction of the physical store object;

In reply to the argument, Langueux discloses:

physical store object (Hub 1 Disk, refer to Fig 7) representing a physical storage device (physical storage device, refer to Col 8, Lines 31);

a volume object (LUN, refer to Col 8, Line 30) representing storage capacity (LUN is the representation of virtual circuit/virtual device, which is the representation of the physical storage device, refer to Fig 24, see the virtual circuit, which represent the storage capacity) that can be allocated from the storage device represented by the physical store object, wherein the volume object presents a logical abstraction of the physical store object (refer to Col 7 and Col 8).

7. Prior art did not expressly disclose a storage cell client object representing a host management agent, wherein the storage cell client object has an interface for coupling to the management interface.

In reply to the argument, Langueux discloses:

a storage cell client object (ISAN server, 102A, refer to Col 9, Lines 28) representing a host management agent, wherein the storage cell client object has an interface (refer to 118, Fig 2) for coupling to the management interface (120, refer to Col 6, Lines 59-67 and Col 7, Lines 20-30).

8. Prior art did not expressly disclose the storage cell client object is capable of represent a host management agent located in any network coupled computing device.

In reply to the argument, Langueux discloses:

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the storage cell client object is capable of represent a host management agent located in any network coupled computing device (Unix, Window, etc, refer to Col 5, support any kind of protocol as well as networking environment, such as storage network refer to Col 5, Lines 56, ethernet network, Col 5, Lines 64, refer to Col 7, Lines 10-20).

9) Prior art did not expressly disclose Claim 9, "specifying at least some of the plurality of physical drives for inclusion in a storage cell."

In reply to the argument, Langueux discloses:

specifying at least some of the plurality of physical disk drives for inclusion in a storage cell (LUN, Storage device or virtual device is the physical disk drive which is within the storage cell, also refer to Col 15, Lines 20-45, by choosing/specifying specific disks, 01, 02, and 04, for the mirror function, which, defines as for storage purpose. And Col 16, Lines 8-50, also, indicates, the physical storage is being selected, which is inclusive/utilized in the system, or, please refer to Col 25, Lines 30-45, See Drives 0-19, Fig 3);

creating a storage cell object (virtual circuit is being created when the conditions are met, refer to Col 20, Lines 37-50) representing the storage cell wherein the physical store objects corresponding to the specified physical disk drives are included in the created storage cell (ISAN server is the storage cell, refer to Col 7, Lines 30).

10. Prior art did not expressly disclose Claim 10, obtaining user specifications of a required failure protection level; obtaining user specifications of a set of physical disk drives;

In reply to the argument, Langueux discloses:

obtaining user specifications of a required failure protection level (the information necessary to instantiate to create a new storage cell object is the failure protection, refer to Col 20, Lines 37-60); and

obtaining user specifications of a set of physical disk drives (to create LUN/storage device/virtual circuit/virtual storage device/storage element, refer to Col 25, Lines 40 ).

11. Prior art did not expressly disclose creating a volume record on each of the physical disk drives includes in the created storage cell;

In reply to the argument, Langueux discloses

creating a volume record (volume record is the capacity of the physical disk drives, which needs to specified/created for each of the physical disk drives, refer to Col 24, Lines 35-45) on each of the physical disk drives includes in the created storage cell.

12. Prior art did not expressly disclose creating a management logical disk object storing metadata describing the created storage cell object

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In reply to the argument, Langueux discloses creating a management logical disk object storing metadata (storage element/storage devices/disk array) describing the created storage cell object (by creating the LUN/array/storage element/storage devices, which forms the tree structure, which defines the storage cell object refer to Col 24, Lines 14-16 ).

13. Prior art did not expressly disclose verifying that at least four physical store objects were specified before creating the storage cell object

In reply to the argument, Langueux discloses verifying that at least four physical store objects were specified before creating the storage cell object (disk array, 132, which is the physical store objects, are inherently comprising more than plurality objects within the array, refer to Col 8, Lines 23).

14. Prior art did not expressly disclose verifying the sufficient physical store object were specified to satisfy the requested device failure protection level before creating the storage cell object;

In reply to the argument, Langueux discloses

verifying the sufficient physical store object were specified to satisfy the requested device failure protection level before creating the storage cell object (to create the virtual circuit, it needs necessary virtual devices/disk array/physical store objects to function, refer to Col 8, Lines 1-2).

15. Prior art did not expressly disclose verifying that ports of the network storage controller are operational before creating the store cell object;

In reply to the argument, Langueux discloses:

verifying that ports of the network storage controller are operational before creating the store cell object (to create store cell object, the processor/controller has to function, which is an inherent feature or else, the processor would not proceed the verification process to order to create the store cell object.).

16. Prior art did not expressly disclose verifying that all of the selected physical store objects are in an operational condition before creating the storage cell object;

In reply to the argument, Langueux discloses:

verifying that all of the selected physical store objects are in an operational condition before creating the storage cell object (will create the only the conditions are satisfied, refer to Col 20, Lines 37-40).

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17) Prior art did not expressly disclose Claim 17,  
creating a logical disk object representing a virtual storage container, wherein the logical disk is an abstract representation of physical storage capacity provided by plurality of physical store;  
adding a storage protocol to the logical disk object using a derived disk object in response to a user protocol selection;  
creating a virtual disk object comprising the logical disk object, the derived disk object and the presented disk object.

In reply to the argument, Langueux discloses:

creating a logical disk object representing a virtual storage container, wherein the logical disk is an abstract representation of physical storage capacity provided by plurality of physical store (refer to Col 16, Lines 35-67, the storage is being created/implemented as an HDM, and is closely associated with LUN since the system is giving the device its identifier, and Col 17, and Fig 24 demonstrate the ability to create LUN, LUN represents the virtual device, virtual circuits and represents the physical storage device, refer to Col 2, Lines 22-27, which provides capacity, refer to Col 17, Lines 13-15 and Fig 24 );

adding a storage protocol to the logical disk object using a derived disk object in response to a user protocol selection (refer to Col 2 and Col 3, Lines 33-60, also see the Col 5, Lines 65-67 and Col 6, Lines 1-5, each storage devices utilized protocol, so each of the device is added on the network, the protocol compliant with it, refer to Col 6, Lines 1-5, Col 7, Lines 14-20, Col 8, Lines 30-40, HDM module groups the virtual device together utilizing the protocol such as SCSI, refer to Col 8, Lines 15-26);

creating a virtual disk object comprising the logical disk object, the derived disk object and the presented disk object (creating the virtual circuits, comprising multiple virtual devices/logical disk object, driver for translation, and HDM module represent the derived disk object, and communication channel driver represents the presented disk object, refer to Col 8, Lines 1-26).

18) Prior art did not expressly disclose Claim 18,

providing the user protocol selection and the user host selection via a management console having a computer interface and communicating the user selection to the host agent;

In reply to the argument, Langueux disclosed:

providing the user protocol selection and the user host selection via a management console having a computer interface and communicating the user selection to the host agent (Col 2 and Col 3, Lines 44-60 and Col 17, Lines 17-25);

## **(11) Conclusion**

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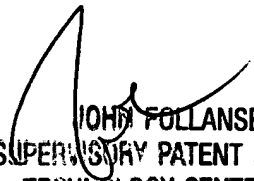
For the above reasons, it is believed that the rejections should be sustained.


Respectfully submitted,

Karen C. Tang

8/30/2006

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